THE INDICATIONS FOR THE MASTOID OPERATION.

BY F. PHINIZY CALHOUN, M.D., ATLANTA, OCULIST AND AURIST TO GRADY HOSPITAL; PRESBYTERIAN HOSPITAL; ST. JOSEPH'S INFIRMARY; PIEDMONT SANITARIUM. ASSOCIATE PROFESSOR OF OPHTHALMOLOGY AND PATHOLOGY, ATLANTA COLLEGE OF PHYSICIANS AND SURGEONS.

The relation that the mastoid bears to intracranial structures is so important that I have chosen the above subject as one of interest to present before this body; and, while I may not interest you in discussing it from an otological point of view, I hope it will be worth your while from the view of a general practitioner and surgeon.

More cases of mastoiditis (both acute and chronic) are seen now than formerly. Not because mastoiditis is more common; not because there are more abscesses of the middle ear; not because we are liable to more colds, but more to our ability to recognize the early symptoms of this important disease. Cases of mastoiditis left to themselves, receiving no treatment except perhaps some hot poultices of flaxseed, soon reach the point where vital structures are placed in danger; and while an operation in the great majority of cases may result in a cure, so far as the suppuration is concerned, one of our most delicate senses is made to suffer, and the organ of hearing is greatly impaired, and the patient remains deaf the balance of his life. It is my purpose, therefore, in this paper, to call your attention to the early operative symptoms of mastoiditis, with a view of maintaining a normal organ.

The indications for a mastoid operation are so evident in the vast majority of cases, that with the application of a few tests, no great skill is required to make the diagnosis certain.

It is the general rule, with some exceptions, that mastoiditis occurs secondarily to an acute purulent otitis media. The drum membrane has usually ruptured, and the canal is filled with a muco-purulent or purulent secretion. In the majority of cases of acute purulent otitis media, there is some mastoid involvement, and pain on palpation can be elicited if sought for. This pain may be due to nothing more than an engorgement of the mucous membrane, lining some of the superficial cells of a highly cellular or pneumatic mastoid, or the antrum, or the large cell at the base of the mastoid might be solely infected, giving symptoms of mastoid infection. These symptoms should subside in a day or so with the subsidence of the acute ear symptoms; but if persistent, they then assume the dignity of symptoms of real mastoiditis, and demand more attention.

In determining the diagnosis, first an inquiry into the history of the case should be made, and, where possible, accurate data kept.

In cases of long duration, for instance, for two or three weeks, we would more than likely have a greater bone destruction than in a case of three or four days' existence. The fact that an attack is a second one would also call our attention to pathological changes that could have taken place in the mastoid, and we would likely find sclerosed bone, indicating that pus forming in this particular case under pressure would be more apt to travel inward toward the brain than outwardly.

Inspection would be our first means of examining the case, and at a glance one could determine whether there was a swelling or redness over the mastoid. But the mere presence of edema or redness over the mastoid should not be taken as conclusive evidence that there is mastoid involvement without a careful examination into the case and an inspection of the canal and drum. An acute otitis externa or furuncle of the canal gives frequently the same picture as that of a sub-periosteal abscess in mastoiditis, and where there is an association of mastoiditis and furuncolosis, the diagnosis is most confusing. Usually, though, traction of the auricle, pressure in the canal with the finger tip or probe, and pressure in front of the tragus is very painful in furuncolosis, and in the absence of an acute otitis media there is likely an absence of a discharge.

An adenitis might cause post-auricular swelling, resembling swelling of mastoiditis; but it is usually superficial and rarely acutely painful.

The swelling of mastoiditis having progressed to the stage of pus formation or not, usually begins in the post auricular fold. It may be of two kinds, viz: a periostitis, with a subsequent infection of the surrounding tissues; or no tissue infection at all, but the spontaneous rupture of the cortex of the mastoid and the escape of the fluid contents subperiosteally. This is usually the case. This type of mastoiditis with marked swelling, the auricle greatly pushed forward, marked fluctuation, and some pain, alarms the general practitioner; often frightens the aurist, and he is impresesd with the idea that the patient is in great danger. As a matter of fact, such a case is in less danger than if the cortex had not ruptured, where the pent of pus under pressure between the two tables of bone is only waiting for the point of least resistance to give way and an intracranial complication results.

I had occasion, a few years ago, in a large New York hospital, to assist in, or operate upon, 271 cases of mastoiditis. Swelling as a symptom in that series did not occur in but 133 cases or about fifty per cent. Of this number of 133 having swelling, 88 or sixty-six per cent., had reached pus formation.

Swelling usually occurs as an early symptom in children and infants, as does also the formation of a subperiosteal abscess, and it occurs as a late manifestation in adults. The statistics in this series that I have collected corroborate this statement. Where a sub-periosteal abscess had formed in an adult it was evidence of a long-standing disease.

Frequently in cases of long standing, we find in the neck beneath the tip attachment of the sterno-mastoid muscle, swelling without fluctuation. It is hard, brawny, and it is only by a deep incision that pus is evacuated. This is called Bezold's mastoiditis, and it is due to the rupture of the inner plate of the mastoid tip in the diagrastic groove, and it usually occurs in cases of several weeks' duration.

Swelling, then, is not the commonest symptom of mastoiditis, by which one not an aurist can make a diagnosis. Some other symptoms more frequently found must be sought, and palpation is that chief sign. The patient's side or profile should face the operator, and while one hand steadies the head to keep him from drawing away, the thumb of the other hand is used to make pressure.

In many acute attacks of otitis media, there is during the first day or so, some pain in the mastoid, usually elicited on deep pressure over the antrum. This character of pain might be compared to the intense neuralgic pains present in the ethmoid cells or the frontal sinus, during an attack of acute coryza. In the acute ear inflammation, under a free myringotomy and proper treatment, unless complications arise, the pain disappears in a few hours to a day after the onset. The pain should not be considered a pronounced symptom of mastoiditis, for cases operated upon during this stage show only an inflamed muco-periosteum, and it is this swollen membrane that causes the pain. If, however, the pain is persistent, lasting five or six days after the onset, one's suspicion should at once be aroused and operative measures entertained.

Gentle but firm pressure must be made, and the points for selection of pressure are the tip, antrum and post tip, and these in the order named will be the areas giving the greatest amount of pain. It would naturally seem that the presence or absence of mastoid tenderness could be easily detected in any case, but considerable care must be exercised, for in nervous or irritable patients, and in children, the slightest pressure will often cause them to wince or cry. The facial expression must be watched, it being the most valuable means of determining pain, and, at the same time, it is best that the patient's attention be diverted from himself.

Tenderness, then, on palpation is the most positive symptom in the absence of other signs that should guide the general practitioner in making a diagnosis of mastoiditis, but, unfortunately, this, too, is lacking in certain cases, making the diagnosis more interesting and somewhat confusing.

Cases of mastoiditis having enormously thickened cortices might mask all evidences of pain on palpation. Mastoids having few cells might do the same. Cases infected by an organism that has caused a stir among otologists, the streptococcus capsulatus, almost invariably act slowly and treacherously, yet with destruction; causing little discomfort to the patient, except a profuse persistent aural discharge. These cases have little pain on palpation, except, perhaps, in the very acute stages. I would then consider cases infected by the streptococcus capsulatus, operative ones, even in the absence of swelling and pain on palpation, after three to four weeks' duration, provided there was a profuse aural discharge, with or without temperature and pathological fundus or canal conditions.

Temperature, while an important symptom, is often deceiving. In the majority of cases it ranges from 99 to 102. In adults, it often remains normal, but it rarely ever remains so in children. Where a temperature is 103 or above, one must at once suspect some intracranial complications as sinus thrombosis, brain abscess, or meningitis.

The examination of the canal and drum, while an important aid to diagnosis so far as the otologist is concerned, perhaps will convey little information to the general practitioner. The drum shows those appearances found in any acute ear, as a reddened, bulging drum, landmarks destroyed and a perforation through which exudes a muco-purulent or purulent secretion. The canal shows an important sign of mastoiditis in the sagging of the posterosuperior canal wall near its drum insertion. This indicates a suppurative focus in the mastoid bone, and represents a soft tissue infection.

Furunculosis causes a narrowing of the canal, and might be mistaken for this important symptom of mastoiditis. There is pain on pressure with a probe in the canal in furunculosis; but little or none in mastoiditis.

We seldom see non-perforated drums in mastoiditis except in children. The longer a drum remains intact in a case of purulent otitis media, the more likely the mastoid will be involved. In infants and children the cortex has less resistance frequently than the drum, and mastoiditis develops with swelling and abscess formation before the drum ruptures. In short, a well-marked case of mastoiditis *can* exist without a discharge from the external ear. This one case well illustrates an important point in the treatment of infants and children:

An infant ten weeks old, so far as the parents knew, was in good health, and had not fretted or cried any more than usual. The day before admission the mother, on giving it its morning bath, had noticed a slight swelling and redness behind the auricle. The examination showed a small fluctuating swelling, posterior to where the tip should be. The drum appeared reddened, bulging with no perforation. The temperature was 100. A myringotomy was done, with a free gush of thick, yellow pus, containing streptococci. The next morning the swelling had disappeared, the temperature was normal, and there was a free discharge from the canal. At the operation the most destructive mastoid I have yet seen in an infant was found, and besides a large extradural cerebella abscess, the cells in the zygomatic region, being well developed for one of this age, were thoroughly infected. The patient recovered.

I am an advocate of a bacteriological examination of aural secretions. It is important and helpful in obscure and doubtful cases of mastoiditis. The pneumococcus and the streptococcus are the organisms causing the greatest number of infections, and appear in all of the malignant types. The pneumococcus is less virulent than the streptococcus in the general run of cases, and given two cases of mastoiditis presenting doubtful operative symptoms, one could afford to wait longer for positive signs in the former (pneumococcus) than in the latter (streptococcus). Where the aural discharge shows a staphylococcus or no organism present, one is safe in concluding that mild or no mastoid symptoms will occur. This is not the invariable rule, for I have seen severe cases of complicated mastoiditis from a staphylococcus infection.

Of late much attention has been given to the making of a diagnosis by blood examinations, chiefly by the estimation of the white cells in point of numbers and in a differential count. The reports of the different investigators of large experience (laboratory men) upon this subject have been so conflicting that, as a general rule, it must be considered of no value. Associated with other symptoms, an increase in the percentage of polymorphonuclear leucocytes, about 80 per cent., would indicate a suppurative focus somewhere, but intercurrent affections and other purulent foci must be borne in mind.

Where there is a leucocytosis and a polynuclear increase we usually find other well-marked symptoms present also, such as an elevation in the temperature.

A resume, then, of the indications for the mastoid operation would show that temperature is valuable, but not reliable. It is often normal in adults; excessively high in children. Blood examinations are of doubtful value, except along scientific investigations, which should not be discouraged. Bacteriological examinations of the aural secretions, besides being of aid in doubtful cases, adds to our scientific knowledge of what causes the disease. Aural examinations, exhibiting nothing but the fundus, sagging of the postero-superior canal wall and the character of the discharge, would hardly warrant an operation in the absence of other more prominent symptoms. Swelling, next to the most important positive sign, is only present in about 50 per cent. of the cases, and a good proportion of these cases are in children. Conditions other than mastoiditis can cause swelling. Palpation revealing tenderness, the most valuable and constant of all the aids, is the safest guide for the general practitioner in diagnosing mastoiditis. This tenderness must not be feigned, but real, and tenderness after the fourth or fifth day must be considered the gravest of mastoid symptoms.

It has not been my intention in this paper to go into the different methods of operating, but, with such well-marked symptoms present in children and adults, as narrated in this paper, I would urge prompt and radical surgical interference.